



## LETM1 gene

leucine zipper and EF-hand containing transmembrane protein 1

### Normal Function

The *LETM1* gene provides instructions for making a protein whose function is not well understood. This protein is active in mitochondria, which are structures within cells that convert the energy from food into a form that cells can use. The LETM1 protein may be involved in the transport of charged calcium atoms (calcium ions) across membranes within mitochondria. Researchers suspect that the protein also plays a role in determining the shape and volume of mitochondria.

### Health Conditions Related to Genetic Changes

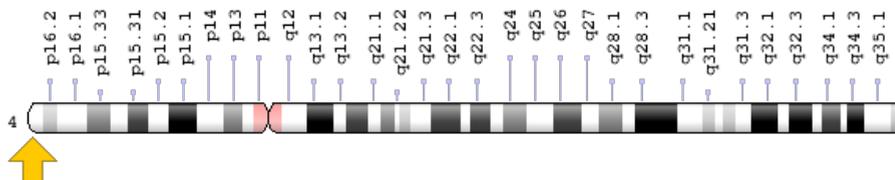
#### Wolf-Hirschhorn syndrome

The *LETM1* gene is located in a region of chromosome 4 that is deleted in people with the typical features of Wolf-Hirschhorn syndrome. As a result of this deletion, affected individuals are missing one copy of the *LETM1* gene in each cell. Studies suggest that a loss of this gene alters the structure of mitochondria; however, it is unclear how this abnormality is related to the signs and symptoms of Wolf-Hirschhorn syndrome. Specifically, a loss of the *LETM1* gene has been associated with seizures or other abnormal electrical activity in the brain.

### Chromosomal Location

Cytogenetic Location: 4p16.3, which is the short (p) arm of chromosome 4 at position 16.3

Molecular Location: base pairs 1,811,479 to 1,856,247 on chromosome 4 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

## Other Names for This Gene

- LETM1\_HUMAN
- leucine zipper-EF-hand containing transmembrane protein 1

## Additional Information & Resources

### GeneReviews

- Wolf-Hirschhorn Syndrome  
<https://www.ncbi.nlm.nih.gov/books/NBK1183>

### Scientific Articles on PubMed

- PubMed  
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28LETM1%5BTIAB%5D%29+OR+%28leucine+zipper+AND+EF-hand+containing%5BTIAB%5D%29%29+AND+english%5BIa%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D>

### OMIM

- LEUCINE ZIPPER/EF-HAND-CONTAINING TRANSMEMBRANE PROTEIN 1  
<http://omim.org/entry/604407>

### Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology  
[http://atlasgeneticsoncology.org/Genes/GC\\_LETM1.html](http://atlasgeneticsoncology.org/Genes/GC_LETM1.html)
- ClinVar  
<https://www.ncbi.nlm.nih.gov/clinvar?term=LETM1%5Bgene%5D>
- HGNC Gene Family: EF-hand domain containing  
<http://www.genenames.org/cgi-bin/genefamilies/set/863>
- HGNC Gene Symbol Report  
[http://www.genenames.org/cgi-bin/gene\\_symbol\\_report?q=data/hgnc\\_data.php&hgnc\\_id=6556](http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=6556)
- NCBI Gene  
<https://www.ncbi.nlm.nih.gov/gene/3954>
- UniProt  
<http://www.uniprot.org/uniprot/O95202>

## Sources for This Summary

- Dimmer KS, Navoni F, Casarin A, Trevisson E, Ende S, Winterpacht A, Salviati L, Scorrano L. LETM1, deleted in Wolf-Hirschhorn syndrome is required for normal mitochondrial morphology and cellular viability. *Hum Mol Genet.* 2008 Jan 15;17(2):201-14. Epub 2007 Oct 9.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/17925330>
- Ende S, Fuhry M, Pak SJ, Zabel BU, Winterpacht A. LETM1, a novel gene encoding a putative EF-hand Ca(2+)-binding protein, flanks the Wolf-Hirschhorn syndrome (WHS) critical region and is deleted in most WHS patients. *Genomics.* 1999 Sep 1;60(2):218-25.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/10486213>
- Nowikovsky K, Froschauer EM, Zsurka G, Samaj J, Reipert S, Kolisek M, Wiesenberger G, Schweyen RJ. The LETM1/YOL027 gene family encodes a factor of the mitochondrial K<sup>+</sup> homeostasis with a potential role in the Wolf-Hirschhorn syndrome. *J Biol Chem.* 2004 Jul 16; 279(29):30307-15. Epub 2004 May 11.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/15138253>
- Schlickum S, Moghekar A, Simpson JC, Steglich C, O'Brien RJ, Winterpacht A, Ende SU. LETM1, a gene deleted in Wolf-Hirschhorn syndrome, encodes an evolutionarily conserved mitochondrial protein. *Genomics.* 2004 Feb;83(2):254-61.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/14706454>
- South ST, Bleyl SB, Carey JC. Two unique patients with novel microdeletions in 4p16.3 that exclude the WHS critical regions: implications for critical region designation. *Am J Med Genet A.* 2007 Sep 15;143A(18):2137-42.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/17696124>
- Tamai S, Iida H, Yokota S, Sayano T, Kiguchiya S, Ishihara N, Hayashi J, Mihara K, Oka T. Characterization of the mitochondrial protein LETM1, which maintains the mitochondrial tubular shapes and interacts with the AAA-ATPase BCS1L. *J Cell Sci.* 2008 Aug 1;121(Pt 15):2588-600. doi: 10.1242/jcs.026625. Epub 2008 Jul 15.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/18628306>

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